B69 The Acceptance of Human Scent as Evidence in the U.S. Court System

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After attending this presentation, attendees will learn about the instru- mental analysis human scent for forensic purposes and the application of human scent evidence in criminal investigations.

This presentation will impact the forensic community and/or humanity by demonstrating how human scent evidence can be a valuable investigative tool which is capable of being admitted as evidence in criminal cases.

The ability of canines, *Canis familiaris,* to locate items of forensic interest such as controlled substances and explosives has long been accepted in the law enforcement community. Of late, canines are being employed to identify individuals based upon a scent match to scent collected from a crime scene. Human scent evidence and scent identification canines have become more commonly used by the law enforcement community in the United States, yet have been used successfully in European countries for over a hundred years. Solid phase micro extraction combined with gas chromatog- raphy / mass spectrometry (SPME-GC/MS) analysis of the volatile com- pounds present in human scent and the use of the relative amounts of these compounds for the instrumental differentiation of individuals has aided in the acceptance of canine human scent identification in the U.S.

The most recent US court ruling pertaining to canines and human scent was a Kelly hearing conducted in late 2004, prior to the prosecution of the State of California V. Benigno Salcido, GA052057, an attempted murder case. The courts questioned the reliability of the STU-100, a scent collection vacuum; whether human scent is unique; how long scent will remain at a location; how long scent captured on a gauze pad will remain and a number of other issues. In this case the odor was collected from the inside of an open window and a bloody knife at the crime scene using the Scent Transfer Unit 100 (STU-100) which uses dynamic air flow to trap the odor on sterile gauze. The collected odor was presented to a specialized bloodhound and the canine led investigators from outside the rear door of the victim's house to a nearby residence. Later collected odor was pre- sented to the bloodhound at the police station where it trailed through the hallways an identified an occupant of the previously identified house.

Specialized bloodhounds provide a yes or no response to the handler at the start of a trail to indicate the presence or absence of a matching scent trail. Canine scent identifications indicate an association between scent col- lected from a suspect and scent collected from the crime scene. During the Kelly hearing, the court heard arguments as to the use of the Scent Transfer Unit 100 (STU-100) for the collection of human scent, the "uniqueness" of human scent, and the durability of human scent after collection on a gauze medium. This paper will discuss the case itself and the research which was presented to answer to court's inquiries about human scent.

SPME-GC/MS has been effectively utilized for the extraction, sepa- ration, and identification of the components of collected human scent samples. These volatile odor signatures have proved to be stable for an individual through weekly scent collection and evaluation, and distin- guishable when compared among people. Comparison of scent profiles among people has revealed that the headspace above collected scent samples contain common compounds which differ in relative peak area ratios across individuals, yet are relatively stable for a single subject. Compounds which are common among individuals include: 2-furan- methanol, phenol, nonanal, decanal, hexanedioic acid-dimethyl ester and 6,10-dimethyl-5,9-undecadien-2-one. The relative ratios of the common compounds along with compounds which differ make discrimination possible.

The ability of an absorber material to retain human scent is also an area of the court's interest. A study into the dissipation of human scent col- lected on gauze absorbent mediums will be presented. It has been shown that there is a measurable amount of human scent weight still present on gauze up to 84 days after a 15 minute scenting period. The ability for dif- ferent types of absorbers and to retain scent weight when exposed to varied conditions such as temperature and light effects will also be discussed.

Canines, Human Scent, SPME-GC/MS

 ** Presenting Author*